CSE 414 Section 8

Cardinality Estimation Practice Solutions

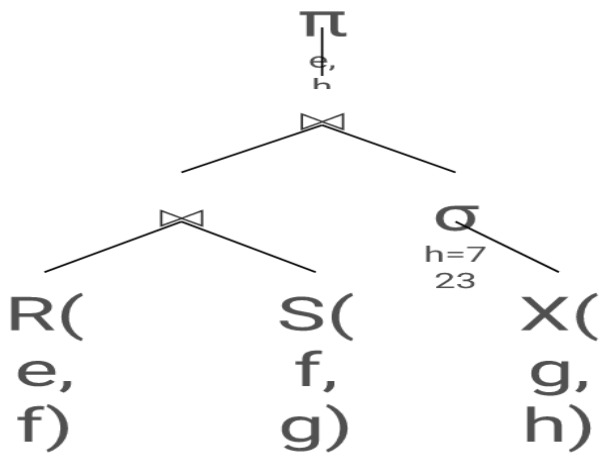
1. You're given the following relations and grocery store stats:

Safeway(id, name, category, price), T=1000, V(name)=900, V(category)=10, V(price)=200, Range(price) = [1,50)
QFC(id, name, category, price), T=2000, V(name)=1900, V(category)=12, V(price)=500

Estimate the cardinality for the following queries:

- Select * from Safeway where id = 45 -- 1 tuple
- Select * from Safeway where name = 'Milk' -- 10/9 tuples
- Select * from Safeway where price < 20 -- (20-1)/(50-1) * 1000 tuples
- Select * from Safeway S, Qfc Q where S.id = Q.id -- 1000 tuples
- Select * from Safeway S, Qfc Q where S.name = Q.name -- (1000*2000)/max{900,1900} tuples

2. (Adapted from 414 SP 17 Final)



Consider the relations R(e, f), S(f, g), and X(g, h) in the query plan depicted above.

- Joins are natural joins that perform on matching attributes (e.g. R join S on R.f = S.f)
- Every attribute is integer-valued
- Assume uniform distributions on the attributes

Table	#tuples
R	1,000
S	5,000
X	100,000

Attribute	# distinct values	Minimum	Maximum
R.f	100	1	1,000
S.f	1,000	1	2,000
S.g	5,000	1	2,000
X.g	1,000	1	10,000
X.h	1,000	1	500,000

A. Estimate the number of tuples in the selection $\sigma_{h=723}(X)$.

We assume a uniform distribution of values for X.h. (Don't be confused—the first X is the selectivity factor, while T(X) is the number of tuples in the "X" table)

$$X = \frac{1}{1000}$$
$$T(X) \cdot X = 100000 \cdot X = 100$$

B. Estimate the number of tuples in the join R ⋈ S.

This natural join is the same as the equijoin R ⋈ (R.f = S.f) S:

$$X = \frac{1}{max(V(R.f), V(S.f))} = \frac{1}{max(100, 1000)} = \frac{1}{1000}$$
$$T(R) \cdot T(S) \cdot X = 1000 \cdot 5000 \cdot X = 5000$$

C. Estimate the cardinality of the final result.

5000 * 100 / max(V(S, g), V(X, g)) = 100